Putting It All Together

Having introduced the main programming ideas for FIT100, it is time to put it all together. The task will be to draw something interesting on the form and in the process get experience writing procedures.
Drawing On The Form

- The form is logically divided into a grid, and a position is designated by how many grid points it is from the Left and the Top
  - The upper left corner is position (0,0)
  - The position (x, y) is x units from Left, and y units from Top
  - Increasing the x value moves to the right
  - Unlike graphing, though, increasing the y value moves down
  - The lower right corner is position (ScaleWidth, ScaleHeight)
- To resize the form, change ScaleWidth and ScaleHeight

The Unit is a twip
Drawing A Line

- To draw a line on Form1, call the procedure
  \[ \text{Form1.Line } (x_1, y_1) - (x_2, y_2) \]

- If there is only one form, the form name can be *elided*

- To get a color, follow the positioning information with the specification of the color
  \[ \text{Form1.Line } (x_1, y_1) - (x_2, y_2), \text{ RGB}(255,255,255) \]

Draw a white line beginning \( x_1 \) units from the Left and \( y_1 \) units from Top, and extending to a point \( x_2 \) units from Left and \( y_2 \) units down from Top.
Recall that colors are created on the screen with a combination of three colors of light -- red, green, blue.

When drawing, one can specify the exact color by calling a procedure, RGB( , , ) whose three parameters are the contribution of the three colors in the range 0 -- 255.

- RGB(0, 0, 0)
- RGB(255, 0, 0)
- RGB(0, 255, 0)
- RGB(0, 0, 255)
- RGB(255, 255, 255)
Drawing a rectangle is like drawing a line except that there is a final parameter “B”

Line \((x1, y1) - (x2, y2)\), RGB\((r, g, b)\), B

A specific fill color can be achieved by having two properties set:

- FillColor = RGB\((, , )\)
- FillStyle = 0

Indicates opaque
Programming A Rectangle

- To begin, draw a box in the Form_Click event handler

```
Option Explicit

Private Sub Form_Click()
    Line (1000, 1000)-(2000, 2000), , B
End Sub
```

Notice the default color, black, and where position (1000,1000) is located ... 1440 twips per inch
Color

- A black rectangle on a gray form is a little dorky ...
- Set the background color of the form
Primp Up The Form

- Make box fill opaque and change line to white line

```vbnet
Option Explicit

Private Sub Form_Click()
    BackColor = RGB(255, 0, 0)
    FillStyle = 0
    Line (1000, 1000)-(2000, 2000), RGB(255, 255, 255), B
End Sub
```
Make A Procedure For Box Drawing

- Draw a 1K×1K box with opaque fill and a white line
- The fill color will be whatever color is set when the procedure is called

```vba
Private Sub Form_Click()
    BackColor = RGB(255, 0, 0)
    FillColor = RGB(0, 0, 0)
    Call box1000(1000, 1000)
End Sub

Private Sub box1000(x1 As Integer, y1 As Integer)
    FillStyle = 0
    Line (x1, y1)-(x1 + 1000, y1 + 1000), RGB(255, 255, 255), B
End Sub
```
More Action, Please

- Click once, create one box
- Click again, show another
- Steps for multiclicks ...
  - Declare clickCount variable
  - In Form_Load initialize it to 0
  - In Form_Click, increment it
  - Then test its value with If
  - For each value do what you want on that click
- 1st: black box
- 2nd: green box
Add Another Option

- Increase the form size to cover whole screen
- Add another “click” case
  - WindowState has 3 values
  - Setting 2 maximizes form
  - Drawing box from (0,0) to (ScaleWidth,ScaleHeight) covers the entire form … make it red!
To Give Motion, Draw On Timer Tick

- Adding a timer allows changes to be made at regular intervals ... place timer anywhere on form
Turn Timer On/Off With Click

- The 4th click starts box draw and the 5th click stops it

```vbnet
Private Sub Form_Click()
    clickCount = clickCount + 1
    If clickCount = 1 Then
        BackColor = RGB(255, 0, 0)
        FillColor = RGB(0, 0, 0)
        Call box1000(1000, 1000)
    ElseIf clickCount = 2 Then
        FillColor = RGB(0, 255, 0)
        Call box1000(3000, 1000)
    ElseIf clickCount = 3 Then
        WindowState = 2
        FillColor = RGB(255, 0, 0)
        Line (0, 0)-(ScaleWidth, ScaleHeight)
        FillColor = RGB(0, 0, 0)
    ElseIf clickCount = 4 Then
        tmrClock.Interval = 200
    Else
        tmrClock.Interval = 0
    End If
```
Randomize!

- Diagonal boxes are boring … randomize
- To place boxes randomly,
  - Set Randomize in Form_Load
  - Declare xPos, yPos in tmrClock
  - Pick a random number in (0,1) range with a Rnd(1) procedure call
  - Multiply by the largest size to scale & make Int
One result ...
Summary

- Project 2 is to design your own “artistic” image … or electronic greeting card to impress your family and friends … and TA
- There is no limit to how intricate your design can be
- There are points for creativity and ...
- You must use procedures as called for in the assignment